

**Before the Federal Communications Commission  
Washington, DC 20554**

In the Matter of	)	
	)	
Carrier Current Systems, including	)	ET Docket No. 04-37
Broadband over Power Line Systems	)	
	)	
Amendment of Part 15 regarding	)	
New requirements and	)	
Measurement Guidelines for	)	
Access Broadband over Power Line Systems	)	

COMMENTS OF AN INDIVIDUAL REGARDING THE INADVISABILITY OF PURSUING THE  
CURRENT PROPOSAL ON BROADBAND OVER POWER LINES IMPLEMENTATION  
AND SUGGESTED MEASUREMENT TECHNIQUE CHANGES

**QUALIFICATIONS AND PREVIEW**

1. The below-identified individual is an engineer with past professional employment as an Electromagnetic Compatibility Engineer, a former Viet Nam era U. S. Army Signal Corps officer, a Registered Professional Engineer, a successful examinee for a Federal Communications Commission First Class Commercial Radiotelephone License with a Ship Radar Endorsement initially issued in 1961, a current holder of a Federal Communications Commission General Radiotelephone License with Ship Radar Endorsement, and an amateur radio licensee since 1958, who respectfully submits comments below that relate to proposed Broadband over Power Line (BPL) implementation by way of modification to Part 15 of the Federal Communications Commission rules (47 CFR 15). The proposed modification to Part 15 would facilitate implementation of a non-conforming series of data modem devices for computers in the proposed spectrum of 2 MegaHertz to 80 MegaHertz (and possibly beyond, according to one would-be manufacturer) by effectively raising the limits on the allowable conducted and radiated emissions through the measurement of a broadband signal as a series of narrowband signals. Based on his research of current literature, his own personal communications experimentation conducted over power lines about 1960, and his experience in diverse communications applications, he has concluded that unacceptable interference to frequencies for various radio services (some of them critical and

essential to national defense, and all of them in active use for other needs) would result from a decision to pursue this technology in any foreseeable future; he further believes that suitable near-term alternatives exist to attain ubiquitous broadband service without pursuing this disadvantageous avenue. Additionally, it seems likely that power line customer susceptibility to high voltage breakdown failures may increase and cause damage to customer owned equipment.

2. He has examined the filings by the Federal Emergency Management Agency (FEMA) of the U. S. Department of Homeland Security<sup>1</sup> and the Disaster Emergency Response Association<sup>2</sup>, and concurs with those assessments of the situation, which will not be repeated here. (For ethics purposes, it should be noted that the latter has been the beneficiary of some other pro bono engineering efforts in the past.) He has also found a filing by Mr. John Robert McAlpine, IV<sup>3</sup>, with whom he had not been in contact for over 30 years, but who, in his usual way, wastes few words in assailing the proposal; Mr. McAlpine's filing is notable in that he is very knowledgeable of the power industry, and he brings to the discussion a compelling dismissal of the currently structured proposal. These three filings are worth the time taken to read them.

3. He is also aware of some ex parte communication provided by an executive in the Federal Emergency Management Agency of the U. S. Department of Homeland Security<sup>4</sup> to the Chairman of the

---

<sup>1</sup> FEMA Office of the Chief Information Officer, signed by Barry C. West, "Comments of the Federal Emergency Management Agency on Broadband over Powerline Implementation." Posted as FCC/CO ET Docket 03-104, 16 December 2003. FCC Comment Database Online Document Locator: [http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native\\_or\\_pdf=pdf&id\\_document=6515292045](http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515292045)

<sup>2</sup> Disaster Emergency Response Association (DERA), Inc., signed by Bascombe J. Wilson, CEM, "Comments of the Disaster Emergency Response Association on Broadband over Powerline Implementation." Posted as FCC/RC ET Docket 03-104, 22 December 2003. FCC Comment Database Online Document Locator: [http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native\\_or\\_pdf=pdf&id\\_document=6515382841](http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515382841)

<sup>3</sup> John Robert McAlpine, IV, "Comments on Broadband over Powerline." Posted as FCC/CO ET Docket 03-104, 4 November 2003. FCC Comment Database Online Document Locator: [http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native\\_or\\_pdf=pdf&id\\_document=6515288997](http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515288997)

<sup>4</sup> Letter, dated January 8, 2004, from Under Secretary Michael D. Brown to Honorable Michael K. Powell. Referenced as footnote 46 in FCC's Broadband over Power Line Notice of Proposed Rule Making (NPRM) 04-29, Adopted 12 February 2004, Released 23 February 2004. FCC Online Document Locator: [http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native\\_or\\_pdf=pdf&id\\_document=6515783486](http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515783486)

Federal Communications Commission. The summary of that letter within the NPRM, cited in NPRM footnote, seems not to be congruent with the content of the FEMA technical filing referenced above.

### **BROADBAND OVER POWER LINE (BPL) SYSTEMS**

4. Power Line Communications (PLC) Systems have been present for over fifty years. In their original use, they were used to provide communications for switching to remote power company equipment. That function has now been replaced in many applications by point-to-point terrestrial microwave systems, which provide a broader bandwidth than was available with the PLC systems so that an extensive, computer-aided capability now exists to monitor and control the power grid. In their heyday, during the middle of the last century, PLC systems provided point-to-point control information in a time when telephone service was not nearly as widely available, and certainly there were no cellular telephones. Today, we have a host of communications services available to supplement the needs of the power companies without the vulnerabilities that PLC possessed, as in the case of downed lines.

5. The present Broadband over Power Line (BPL) proposal has to do with the use of simultaneous transmissions on parallel channels that are closely spaced in frequency through a technique known as Orthogonal Frequency Division Multiplexing (OFDM). Through the use of these parallel paths, greater data rates can be accomplished, but this is at the expense of a greater aggregation of spectral bandwidths. Since this means, in the case of BPL, that these signals will be independent but simultaneous channels, the amount of power available to send these signals will be limited by the channel measurements on each channel, as opposed to sending all of the information on one channel. This avoids the normal interpretation of Part 15 rules which have radiated emission limits under the presumption that one is talking about a single carrier frequency with associated sideband energy, all meeting a single limit. Another implication is that the total bandwidth, due to the channel-to-channel separation, will likely be greater than a carrier with the equivalent information in the associated sidebands.

6. As a result of the greater bandwidth and greater aggregate power, this technology has a greater potential to create more interference to other communications links, especially if this technology is deployed over cables that do not confine the signals to the cable pathway. This is the case with ODFM signals put over power lines; the unsuitability of power lines as a medium is well discussed in a filing for the FCC Notice of Inquiry 03-104 on the same subject<sup>5</sup>, and will not be repeated here.

### **PRIMARY TECHNICAL PROBLEMS WITH PROPOSED BPL SYSTEMS**

7. BPL, as proposed, has the potential to wreak havoc with established communications systems using portions of the Medium Frequency (MF), High Frequency (HF), and Very High Frequency (VHF) spectrums, respectively ranging from 0.3 to 3 Megahertz (MHz), 3 to 30 MHz, and 30 to 300 MHz.<sup>6</sup> The current experimental authorization is for operational tests from 2 to 80 MHz, but at least one manufacturer had consideration indicated in the NPRM of operation of up to 130 MHz. If nothing else could be concluded from the over 5,100 comments filed during the NOI, it is that reportedly over 98% of the filers anticipated some sort of a problem with BPL; a sampling indicated that the primary concern was interference to established communications, and these filers had no pecuniary interest in the matter.

8. The users of these established communications facilities have varied interests. All have a substantial investment in a mode which offers dependability and reliability when other means fail. Here are two pictures showing portions of the national infrastructure that will be damaged if BPL is not controlled.

---

<sup>5</sup> Dennis I. O'Quinn, "Comments on Broadband over Powerline." Posted as FCC/CO ET Docket 03-104, 5 February 2004. FCC Comment Database Online Document Locator:  
[http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native\\_or\\_pdf=pdf&id\\_document=6515683209](http://gulfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6515683209)

<sup>6</sup> Ibid.



Pic 1 Wyoming NG EOC

The implementation of Access BPL could harm homeland security, and not enhance it, by limiting this EOC.



Pic 2 American Red Cross Building in

Melbourne, FL  
With collocated, privately funded amateur Radio Station with two beam antennas  
BPL could degrade operational capability of the ARC and other disaster relief agencies

9. An unintended consequence of the Access BPL is that it could create an unintended path from medium voltage lines to the consumer's lines. This could mean that 2,400 volts or more could be connected to the 110 volt lines in the case of a lightning or other induced failure, leading to substantial risk of damage or injury. This, too, has been well discussed previously.<sup>7, 8</sup> (It should also be noted that 2,400 volts is the lower end of the distribution voltage range. There are neighborhoods where 7,000 volts and 13,000 volts are used for distribution just prior to conversion to 110 and 220 volts. This simply elevates the risk and liability factor for any participant in the deployment of Access BPL.)

### **OTHER PROBLEMS WITH PROPOSED BPL SYSTEMS**

10. BPL seems to have become a political issue, rather than an engineering issue. The technical and engineering talent has a strong consensus: BPL is a bad idea. That has remained constant since its initial proposal in 2003. The result is that political considerations are being invoked to attempt to influence scientific efforts. This is bad science. One of the repeated cliches is that BPL will enhance Homeland Security, but usually this assertion stops at this sentence. Instead of enhancing Homeland Security, it appears that BPL would degrade it by consolidating power delivery and communications. By

---

<sup>7</sup> Idem., O'Quinn

<sup>8</sup> "DERA Makes Headlines on Broadband over Powerline Issue," *DisasterCom*, April 2004, page 3  
(This issue is available on-line at <http://www.disasters.org> . )

keeping these two activities separate, there is less susceptibility to sabotage or natural failure creating two failures.

11. Given that OFDM is really a set of independent but synchronized signals, instead of measuring each as a separate narrowband carrier, the entire composite signal output should be considered as one source with perhaps typically 256 separate sidebands. This would result in decreasing the allowable signal level of each signal by at least 12 decibels, to approximately 6.25% of its original power level. This would be consistent with other Part 15 measurements where the modulation sidebands are considered as part of the observed power. The results in a TV signal bandwidth would decrease the expected interference as well as decreasing the interference in a communications channel with only one OFDM carrier present.

12. It has been established in the first of two **National Telecommunications and Information Administration** reports on BPL<sup>9</sup> that the signal levels vary in almost unpredictable patterns around BPL installations. Clearly there is no test scenario which will compensate for the unpredictability of various installations which were not designed or installed to carry RF signals and to keep them suppressed. Much has been made of the supposed unfeasibility of measuring Conducted Emissions from the BPL signal sources, and it is true that it could be risky or even fatal. However there is a solution, and that is to make many measurements until the worst case situations are identified and scientifically described. The output of the devices at a compliance level is then the highest output power allowable, and the equipment authorization process by the FCC needs to assure that the equipment is incapable of producing a higher power output. It is proposed that the FCC regulations incorporate this measurement through a Conducted Emissions test in a test environment that simulates the worst case situation(s).

---

<sup>9</sup> National Telecommunications and Information Administration BPL Phase I Report, Report 04-413  
(See NTIA Reports> Broadband-Over-Powerline Report at <http://www.ntia.doc.gov/reports.html>)

## **CONCLUSION**

13. The proposed Broad band over Power Lines arrived in 2003 as a bad idea. It is still a bad idea due to its capability to disrupt other communications services without any corresponding gain for its proposed and stated objective in light of other, acceptable, and feasible alternatives presently available.<sup>10</sup>

14. The end of the NPRM Comment period ended within less than a week after the first NTIA BPL report became available. This has prevented a better analysis of the performance of BPL. Further FCC action should await the publication of the second report.

May 3, 2004

Respectfully submitted



Dennis L. O'Quinn

P. O. Box 1118  
Melbourne, Florida 32902-1118

Email: FLDOQ@HOTMAIL.COM

---

<sup>10</sup> Idem., O'Quinn